

CLAIMS

1. An information recording medium comprising:

a first recording layer in which a first recoding track path for
5 recording record information, is formed;

a second recording layer which is disposed on said first recording
layer and in which a second recoding track path for recording the record
information, is formed in an opposite direction to the first recording track
path; and further,

10 a first buffer area (i) for preventing a recording or reproduction
position from deviating from said first recording layer or said second
recording layer, and (ii) for layer jump, on an outer circumferential edge
portions of said first recording layer and said second recording layer,

at least one portion of said first buffer area being formed in advance
15 as a pre-recorded area, of embossed pits or pits obtained by irradiation of
recording laser.

2. The information recording medium according to claim 1, wherein

said information recording medium further comprises a control data
20 zone in a lead-in area accessed before the record information is recorded, as
another pre-recorded area, and

identification information indicating that said first buffer area is
formed in advance, is recorded in said control data zone.

25 3. The information recording medium according to claim 1, wherein

pre-format address information is recorded in said first recording

layer and said second recording layer, and

identification information indicating that said first buffer area is formed in advance, is added to the pre-format address information.

5 4. The information recording medium according to claim 2, wherein start / end address information indicating a start or end position of at least one portion of said first buffer area formed in advance, is recorded in said control data zone, or is added to pre-format address information.

10 5. The information recording medium according to claim 4, wherein the start / end address information indicates that said first buffer area is not formed in advance, when having a predetermined value.

6. The information recording medium according to claim 1, wherein (i)
15 at least one portion of said first buffer area is formed in advance of embossed pits, and (ii) a recording film capable of performing additional recording is laminated thereon.

7. An information recording apparatus (i-a) for recording a first portion
20 of the record information along the first recording track path, and (ii-a) for recording a second portion of the record information, with a recording direction turned around, along the second recording track path, with respect to said information recording medium according to claim 1 constructed such that said first recording layer has a first recording capacity and said second
25 recording layer has a second recording capacity,

said information recording apparatus comprising:

a writing device capable of respectively writing the first portion and the second portion into said first recording layer and said second recording layer;

5 a calculating device for calculating a turn-around address on the first recording track path, in turning around from the first recording track path to the second recording track path, in a case (iii) where the first portion with an information amount which does not satisfy the first recording capacity, out of the record information, is written along the first recording track path, and (iv) where the second portion with an information amount which does not satisfy
10 the second recording capacity is written along the second recording track path, on the basis of (v-1) a total information amount of the record information, (v-2) the start / end address information, (v-3) the first recording capacity, and (v-4) the second recording capacity; and

a controlling device for controlling said writing device, (i) to write the
15 first portion along the first recording track path up to the calculated turn-around address, (ii) to add buffer data so as to form another portion of said first buffer area in said first recording layer and said second recording layer, and (iii) to write the second portion along the second recording track path from a correspondence address in said second recording layer
20 corresponding to the calculated turn-around address in said first recording layer.

8. The information recording apparatus according to claim 7, wherein said controlling device controls said writing device to write the buffer data, in
25 order to form a second buffer area for preventing a recording or reproduction position from deviating from an inner circumferential edge portion of said

second recording layer, in response to a finalize instruction for maintaining compatibility with a read-only or reproduce-only information recording medium.

5 9. The information recording apparatus according to claim 7, wherein said controlling device controls said writing device to write the buffer data, in order to form a third buffer area located on an inner circumferential side of said first buffer area, on the basis of (i) the total information amount of the record information, (ii) the start / end address information, (iii) the first
10 recording capacity, and (iv) the second recording capacity.

10. The information recording apparatus according to claim 7, wherein said controlling device controls said writing device to write the buffer data, in order to form a fourth buffer area linked to said first buffer area, on the basis
15 of (i) the total information amount of the record information, (ii) the start / end address information, (iii) the first recording capacity, and (iv) the second recording capacity.

11. The information recording apparatus according to claim 7, wherein
20 said controlling device controls said writing device to write the buffer data, in order to form a plurality of buffer areas located on an inner circumferential side of said first buffer area, on the basis of (i) the total information amount of the record information, (ii) the start / end address information, (iii) the first recording capacity, and (iv) the second recording capacity.

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12. An information recording method in an information recording

apparatus comprising a writing device for (i-a) recording a first portion of the record information along the first recording track path, and (ii-a) for recording a second portion of the record information, with a recording direction turned around, along the second recording track path, with respect to said information recording medium according to claim 1 constructed such that said first recording layer has a first recording capacity and said second recording layer has a second recording capacity,

said information recording method comprising:

a calculating process of calculating a turn-around address on the first recording track path, in turning around from the first recording track path to the second recording track path, in a case (iii) where the first portion with an information amount which does not satisfy the first recording capacity, out of the record information, is written along the first recording track path, and (iv) where the second portion with an information amount which does not satisfy the second recording capacity is written along the second recording track path, on the basis of (v-1) a total information amount of the record information, (v-2) the start / end address information, (v-3) the first recording capacity, and (v-4) the second recording capacity; and

a controlling process of controlling said writing device, (i) to write the first portion along the first recording track path up to the calculated turn-around address, (ii) to add buffer data so as to form another portion of said first buffer area in said first recording layer and said second recording layer, and (iii) to write the second portion along the second recording track path from a correspondence address in said second recording layer corresponding to the calculated turn-around address in said first recording layer.

13. A computer program of instructions for recording control and for tangibly embodying a program of instructions executable by a computer provided in the information recording apparatus according to claim 7, the
5 computer program making the computer function as at least one portion of said controlling device, said calculating device, and said writing device.